iBOX-210

User Manual

Version 1.0
Published May 2014
Copyright©2014 ASRock Inc. All rights reserved.

Copyright Notice:

No part of this documentation may be reproduced, transcribed, transmitted, or translated in any language, in any form or by any means, except duplication of documentation by the purchaser for backup purpose, without written consent of ASRock Inc.

Products and corporate names appearing in this documentation may or may not be registered trademarks or copyrights of their respective companies, and are used only for identification or explanation and to the owners' benefit, without intent to infringe.

Disclaimer:

Specifications and information contained in this documentation are furnished for informational use only and subject to change without notice, and should not be constructed as a commitment by ASRock. ASRock assumes no responsibility for any errors or omissions that may appear in this documentation.

With respect to the contents of this documentation, ASRock does not provide warranty of any kind, either expressed or implied, including but not limited to the implied warranties or conditions of merchantability or fitness for a particular purpose.

In no event shall ASRock, its directors, officers, employees, or agents be liable for any indirect, special, incidental, or consequential damages (including damages for loss of profits, loss of business, loss of data, interruption of business and the like), even if ASRock has been advised of the possibility of such damages arising from any defect or error in the documentation or product.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

CALIFORNIA, USA ONLY

The Lithium battery adopted on this motherboard contains Perchlorate, a toxic substance controlled in Perchlorate Best Management Practices (BMP) regulations passed by the California Legislature. When you discard the Lithium battery in California, USA, please follow the related regulations in advance.
"Perchlorate Material-special handling may apply, see www.dtsc.ca.gov/hazardouswaste/perchlorate"

ASRock's Website: www.ASRock.com

Replaceable batteries

CAUTION
RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

Contact Information

If you need to contact ASRock or want to know more about ASRock, you're welcome to visit ASRock's website at www.ASRock.com; or you may contact your dealer for further information.

ASRock Incorporation

6F., No.37, Sec. 2, Jhongyang S. Rd., Beitou District,

Taipei City 112, Taiwan (R.O.C.)

Contents

Chapter 1 Introduction **1**

1.1 Package Contents 1

1.2 Product Specifications 2

1.3 Block Diagram 3

Chapter 2 Product Overview **4**

2.1 Inside View 4

2.2 Front View 5

2.3 Rear View 6

Chapter 3 Hardware Installation **7**

3.1 Removing the Chassis Bottom Cover 8

3.2 Installing Memory Modules (SO-DIMM) 9

3.3 Installing the 2.5-inch Hard Drive 10

3.4 Installing the WiFi module and the WiFi antennas (Optional) 12

3.5 Replacing the Chassis Bottom Cover 14

Chapter 4 Motherboard **15**

4.1 Motherboard Layout 15

4.2 Motherboard Specifications 17

4.3 Jumpers Setup 19

4.4 Onboard Headers and Connectors 21

4.5 Expansion Slots (mini-PCIe and mini-PCIe/mini-SATA Slots) 26

Chapter 1 Introduction

Thank you for purchasing iBOX-210, a reliable embedded box PC produced under ASRock's consistently stringent quality control. It delivers excellent performance with robust design conforming to ASRock's commitment to quality and endurance.

Because the hardware specifications might be updated, the content of this documentation will be subject to change without notice. In case any modifications of this documentation occur, the updated version will be available on ASRock's website without further notice. If you require technical support related to this product, please visit our website for specific information about the model you are using.
ASRock's Website: www.asrock.com

The illustrations shown in this manual are examples only, the actual system may differ slightly .

1.1 Package Contents

- iBOX-210
- SBC-210/211 (pre-installed motherboard)
- 1 x SATA 1 to 1 Power Cable
- 4 x HDD Screws (M3x4)
- 1 x WiFi Module Screw (M2x3)
- 1 x Screw for mini-PCIe/mini-SATA slot (M2x3)
- Power Adapter
- User Manual

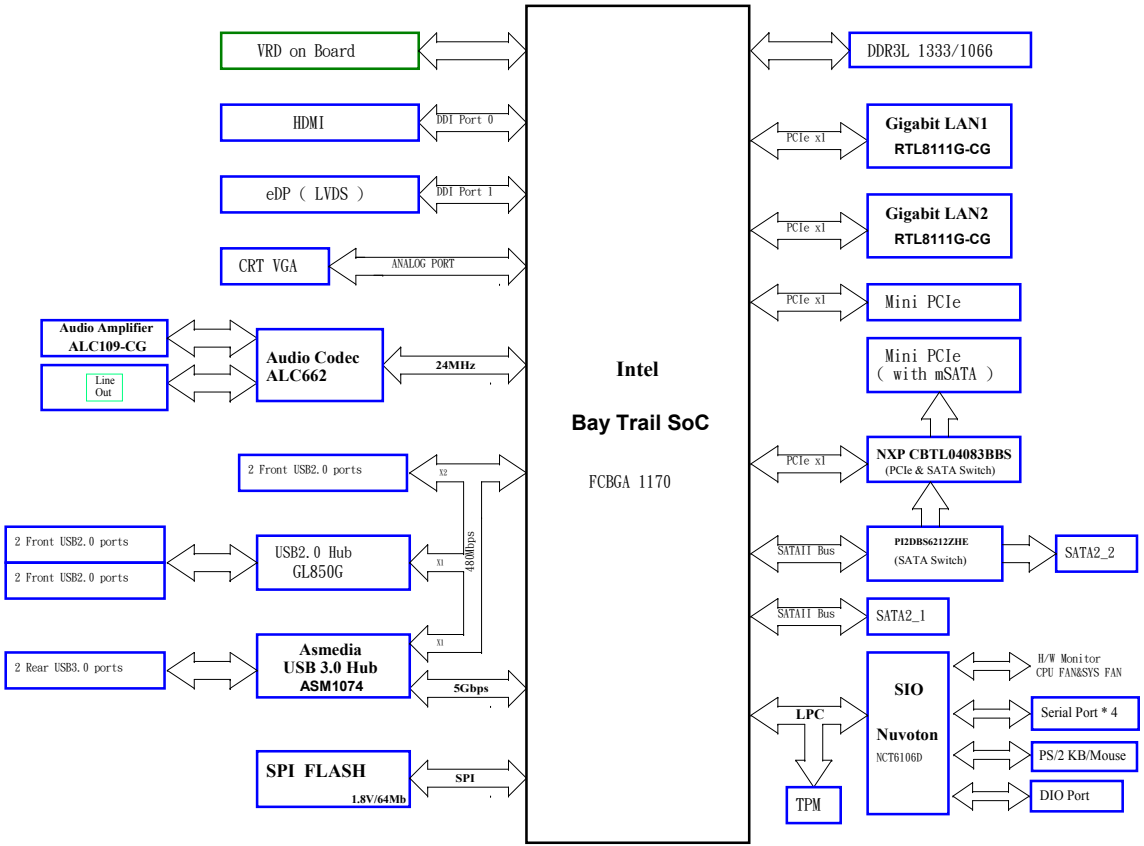
If any items are missing or appear damaged, contact your authorized dealer.

1.2 Product Specifications

iBOX-210	
Processor System	
CPU	Intel® Atom™ Baytrail SoC processor J1900/N2930/E3845/ E3815 Quad/Single Core up to 2GHz
Memory	1 x DDR3L 1333MHz SO-DIMM up to 4 GB
Chipset	N/A
Graphic	Intel Gen7
LAN Chipset	Realtek RTL8111G
Watch Dog	256 Segments,0,1,2,…255sec/min
Rear I/O	
Serial Port	1 x RS232/485/422, 1 x RS232
USB	2 USB 3.0 ports/2 USB2.0 ports
LAN	1 RJ45 Port for Gbe
Vedio output	1 x VGA output/ 1 x HDMI
Audio	Line out
Expansion	1 x mini PCIe /1 x mSATA
Storage	
Type	1 x 2.5" HDD/ SSD
OS Support	
Window 8/7 Linux	
Certifications	
CE, FCC, Class A	
Environmental	
Operating Temp	0°C~50°C
Storage Temp	-20°C~80°C
Humidity	10%~90%
Mechanical	
Material	Top cover -aluminum extrusion/ Base- metal
Dimension	200x134.5x 39mm
Weight	1.3 kg
Mounting	mounting bracket (optional)

** For detailed product information, please visit our website: http://www.asrock.com*

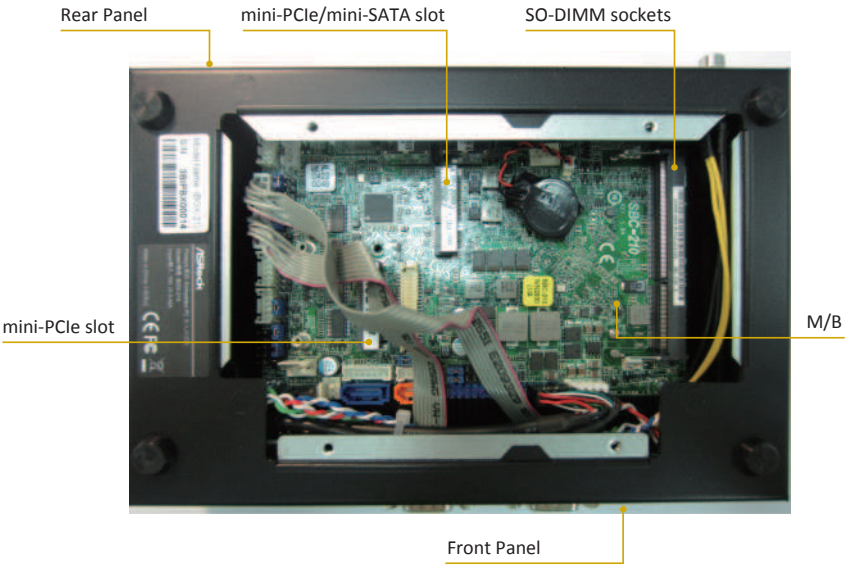
English


VRD on Board
HDMI
DDI Port 0
eDP (LVDS)
DDI Port 1
CRT VGA
ANALOG PORT
Audio Amplifier
ALC109-CG
Line Out
Audio Codec
ALC662
24MHz
2 Front USB2.0 ports
X2
2 Front USB2.0 ports
2 Front USB2.0 ports
USB2.0 Hub
GL850G
X1
480Mbps
2 Rear USB3.0 ports
Asmedia
USB 3.0 Hub
ASM1074
X1
5Gbps
SPI FLASH
1.8V/64Mb
SPI
Intel
Bay Trail SoC
FCBGA 1170
DDR3L 1333/1066
PCIe x1
Gigabit LAN1
RTL8111G-CG
PCIe x1
Gigabit LAN2
RTL8111G-CG
PCIe x1
Mini PCIe
Mini PCIe
(with mSATA)
PCIe x1
NXP CBTL04083BBS
(PCIe & SATA Switch)
SATAII Bus
PI2DBS6212ZHE
(SATA Switch)
SATA2_2
SATAII Bus
SATA2_1
LPC
TPM
SIO
Nuvoton
NCT6106D
H/W Monitor
CPU FAN&SYS FAN
Serial Port * 4
PS/2 KB/Mouse
DIO Port

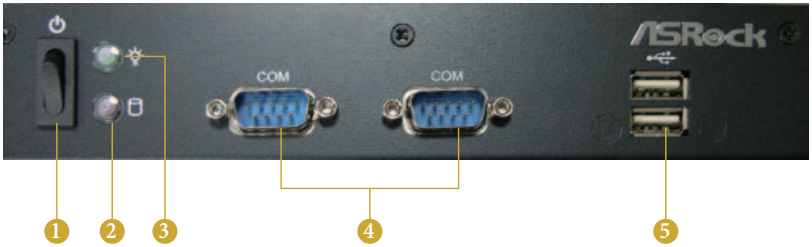
Chapter 2 Product Overview

This chapter provides diagrams showing the location of important components of the iBOX-210.

2.1 Inside View



2.2 Front View



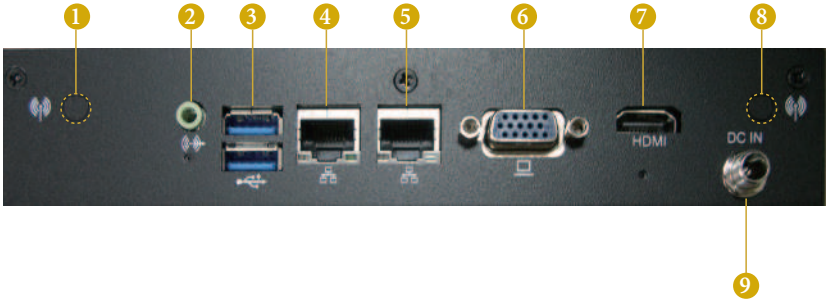
No.	Description
1	On-/off Switch
2	HDD LED
3	Power LED
4	2 x COM Ports
5	2 x USB 2.0 Ports

Status LED Definitions

Power LED	
Status	**Description**
Solid Green	Power on
Off	Power off

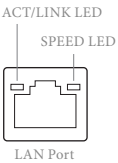
HDD Status LED	
Status	**Description**
Red	HDD installed
Off	HDD uninstalled

2.3 Rear View



No.	Description	No.	Description
1	Antenna Port	6	VGA Port (VGA1)
2	Line out (Lime)	7	HDMI Port (HDMI1)
3	2 x USB 3.0 Ports (USB01)	8	Antenna Port
4	LAN RJ-45 Port (LAN1)*	9	DC Jack (DC IN)
5	LAN RJ-45 Port (LAN2)*		

** There are two LEDs on each LAN port. Please refer to the table below for the LAN port LED indications.*



Activity / Link LED		Speed LED	
Status	Description	Status	Description
Off	No Link	Off	10Mbps connection
Off	Data Activity	Orange	100Mbps connection
On	Link	Green	1Gbps connection

Chapter 3 Hardware Installation

This chapter provides step-by-step procedures on how to install components.

Installation Procedures

1. Removing the chassis bottom cover
2. Installing the memory modules (SO-DIMM)
3. Installing the 2.5-inch hard drive
4. Installing the WiFi module and the WiFi antennas **(Optional)**
5. Replacing the chassis top cover

After making sure that you have properly connected the power supply and all the necessary peripherals, power on the system.

3.1 Removing the Chassis Bottom Cover

1. Remove the four screws on the bottom case.
2. Lift up and remove the top cover.

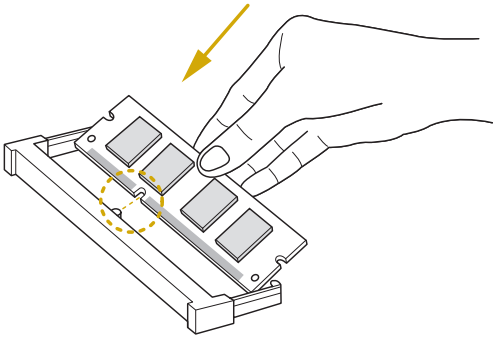
3.2 Installing Memory Modules (SO-DIMM)

This motherboard provides two 204-pin DDR3 (Double Data Rate 3) SO-DIMM slots. Please install the SO-DIMM module into the DDR3_A2 for the first priority.

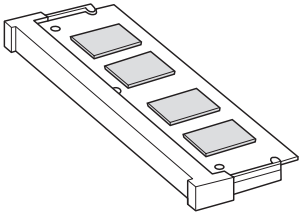
It is not allowed to install a DDR or DDR2 memory module into a DDR3 slot; otherwise, this motherboard and SO-DIMM may be damaged.

The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the motherboard and the SO-DIMM if you force the SO-DIMM into the slot at incorrect orientation.

1



2

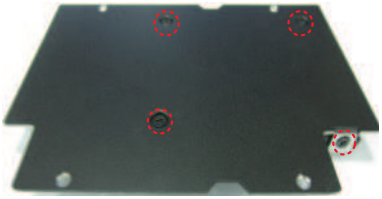


3.3 Installing the 2.5-inch Hard Drive

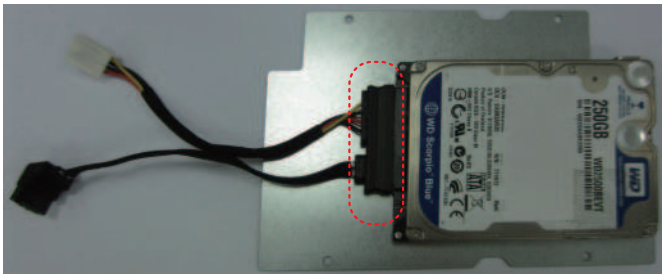
1. Attach the HDD onto the bottom cover with the printed circuit board side facing down. Carefully align the mounting holes in the hard drive and the bottom cover.
2. Secure the hard drive into the place using the four screws.
3. Attach one end of the SATA 1 to 1 Power Cable to the hard drive.

1

2

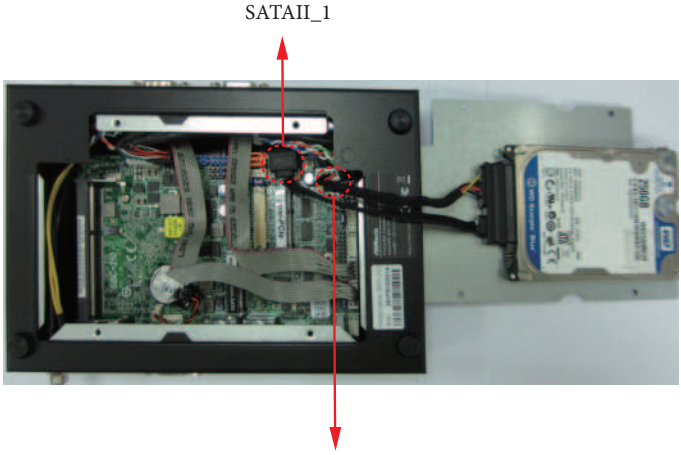


3



4. Attach the SATA data cable and power cable to the motherboard.

4



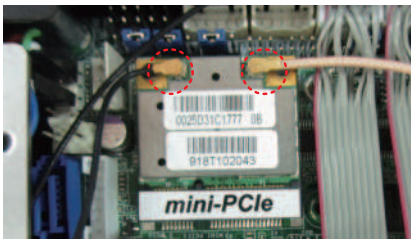
3.4 Installing the WiFi module and the WiFi antennas (Optional)

1. Insert the WiFi Module Card into the mini PCI Express slot (MINI_PCIE1).
2. Tighten the screw that holds the card in place.
3. Attach the SMA Wi-Fi Antenna Cables to the WiFi Module.

1

2

3



4. Insert the RP-SMA Wi-Fi Antenna Connectors to the antenna ports on the rear panel. Then fasten the screw nuts to secure the antenna connectors.
5. Connect the two WiFi 2.4/5 GHz Antennas to the antenna connectors. Turn the antenna clockwise until it is securely connected.
6. Set the WiFi 2.4/5 GHz Antenna at 90-degree angle.
   *You may need to adjust the direction of the antenna for a stronger signal.

4

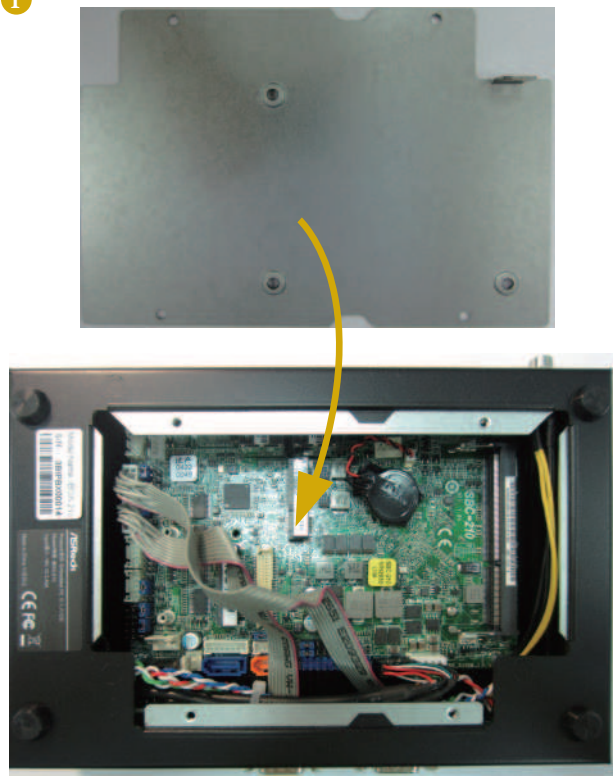
5

6

3.5 Replacing the Chassis Bottom Cover

1. Replace the top cover.
2. Secure the four screws at the bottom.

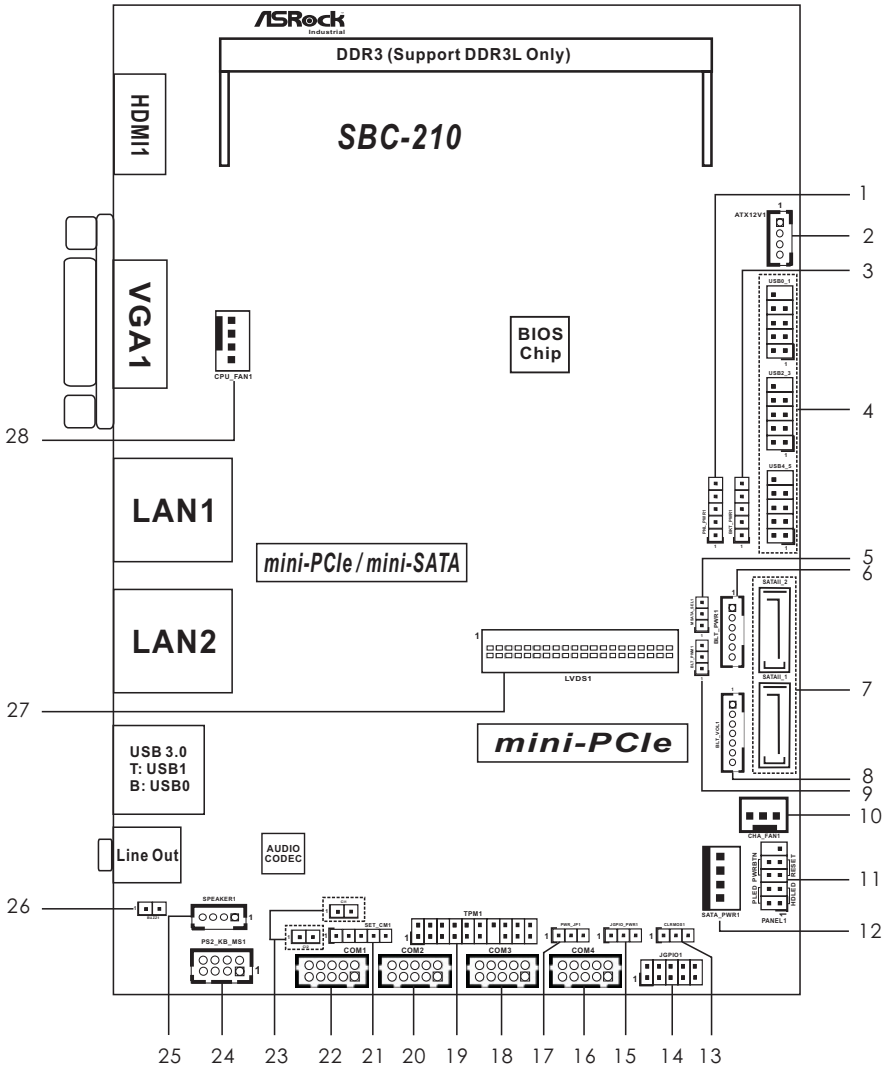
1



2

Chapter 4 Motherboard

4.1 Motherboard Layout



English

No.	Description
1	Panel Power Selection (PNL_PWR1)
2	ATX Power Connector
3	Backlight Power Selection (BKT_PWR1)
4	USB2.0 Headers (USB0_1, USB2_3, USB4_5)
5	mSATA Selection
6	Inverter Power Control Wafer (BLT_PWR1)
7	SATA2 Connectors (SATAII_1, SATAII_2)
8	Backlight & Amp Volume Control (BLT_VOL1)
9	Backlight Control Level (BLT_PWM1)
10	3-Pin Chassis FAN Connector
11	System Panel Header
12	SATA Power Output Connector
13	Clear CMOS Header
14	Digital Input / Output Pin Header
15	Digital Input / Output Power Select
16	COM Port Header (COM4)
17	ATX/AT Mode Selection
18	COM Port Header (COM3)
19	TPM Header
20	COM Port Header (COM2)
21	SET_CM1
22	COM Port Header (COM1)
23	Chassis Intrusion Headers (CI1, CI2)
24	PS2_KB_MS1
25	3W Audio AMP Output Wafer
26	2-Pin Buzzer Header
27	LVDS Panel Connector
28	4-Pin CPU FAN Connector

4.2 Motherboard Specifications

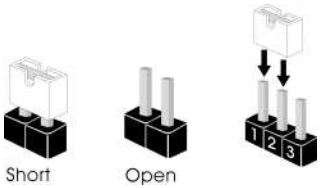
Form Factor	Dimensions	3.5" SBC (5.8-in x 4.0-in) / (146 x 102 mm)
Processor System	CPU	Intel® new Atom™ Baytrail-M/D/E Series
	Core Number	4
	Max Speed	(By CPU)
	Cache	(By CPU)
	Chipset	N/A
	BIOS	UEFI
Expansion Slot	PCI	0
	Mini-PCIe	1 (Half Size) + 1 (Full Size) shared with mSATA
	mSATA	1 (Full Size) shared with SATAII_2
	PCIe	0
	CFast Card Socket	0
Memory	Technology	Single Channel DDR3L 1066/1333 MHz SDRAM
	Max.	4GB
	Socket	1 x SO-DIMM
Graphics	Controller	Intel® Gen7 Intel Graphics DX 11, OGL3.2
	VRAM	Shared Memory
	VGA	Supports max. resolution 1920 x 1200
	LVDS	Dual channel 24-bit, max resolution 1920 x 1200 @60Hz
	HDMI	Supports HDMI 1.4a, max resolution 1920 x 1200
	DVI	N/A
	DisplayPort	N/A
	Multi Display	Yes (Dual Display)
Ethernet	Ethernet	10/100/1000 Mbps
	Controller	GbE LAN: Realtek RTL8111G-CG
	Connector	2 x RJ-45
SATA	Max Data Transfer Rate	SATA2 (3.0Gb/s)
Rear I/O	VGA	1
	DVI	0
	HDMI	1
	DisplayPort	0
	Ethernet	2
	USB	2 x USB 3.0 compliant
	Audio	1 (Line out)
	Serial	0
	PS/2	0

Internal Connector	USB	6 (3*2.54 pitch header USB 2.0 compliant)
	LVDS/Inverter	1/1
	VGA	0
	Serial	4 (RS-232)
	SATA	2x SATA2 (3.0Gb/s) (SATAII_2 is shared with mSATA)
	Parallel	0
	IrDA	0
	GPIO 8-bit	4 x GPI + 4 x GPO
	SATA PWR Output Con	1
	Speaker Header	1
Watchdog Timer	Output	From Super I/O to drag RESETCON#
	Interval	256 segments, 0,1,2…255sec/min
Power Requirements	Input PWR	9-36V DC-In using 4-pin ATX PWR Con
	Power On	AT/ATX Supported AT: Directly PWR on as power input ready ATX: Press button to PWR on after power input ready
Environment	Temperature	0°C – 60°C

** For detailed product information, please visit our website: http://www.asrock.com*

4.3 Jumpers Setup

The illustration shows how jumpers are setup. When the jumper cap is placed on the pins, the jumper is “Short”. If no jumper cap is placed on the pins, the jumper is “Open”. The illustration shows a 3-pin jumper whose pin1 and pin2 are “Short” when a jumper cap is placed on these 2 pins.



Clear CMOS Jumper (CLRCMOS1) (see p.15, No. 13)	Default	Clear CMOS

CLRCMOS1 allows you to clear the data in CMOS. To clear and reset the system parameters to default setup, please turn off the computer and unplug the power cord from the power supply. After waiting for 15 seconds, use a jumper cap to short pin2 and pin3 on CLRCMOS1 for 5 seconds. However, please do not clear the CMOS right after you update the BIOS. If you need to clear the CMOS when you just finish updating the BIOS, you must boot up the system first, and then shut it down before you do the clear-CMOS action. Please be noted that the password, date, time, and user default profile will be cleared only if the CMOS battery is removed.

Digital Input/Output PWR Select (3-pin JGPIO_ PWR1) (see p.15, No. 5)		1-2 : +12V 2-3 : +5V

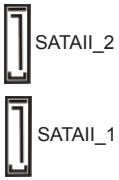
ATX/AT Mode Selection (3-pin PWR_JP1) (see p.15, No. 17)		1-2: AT Mode 2-3: ATX Mode

Panel Power Selection (LCD_ VCC) (5-pin PNL_PWR1) (see p.15, No. 1)		Use this to set up the VDD power of the LVDS connector. 1-2: +3V 2-3: +5V 3-4: +5V 4-5: +12V
Backlight Power Selection (LCD_BLT_VCC) (5-pin BKT_PWR1) (see p.15 No. 3)		Use this to set up the backlight power of the LVDS connector. 1-2: +5V 2-3: +12V 3-4: +12V 4-5: DC_IN Power
Backlight Control Level (3-pin BLT_PWM1) (see p.15 No. 9)		1-2: +3V 2-3: +5V
COM Port PWR Setting Header (5-pin SET_CM1) (see p.15 No. 21)		1-2: +12V 2-3: +5V 3-4: +5V 4-5: N/A
mSATA Selection (3-pin MSATA_SEL1) (see p.15 No. 5)		1-2: SATAII_2 + mini-PCIe 2-3: mSATA, SATAII_2 no function

4.4 Onboard Headers and Connectors

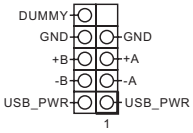
Onboard headers and connectors are NOT jumpers. Do NOT place jumper caps over these headers and connectors. Placing jumper caps over the headers and connectors will cause permanent damage to the motherboard.

SATA2 Connectors
(SATAII_1, SATAII_2)
(see p.15, No. 7)



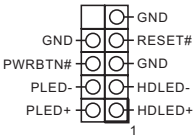
These two Serial ATA2 (SATA2) connectors support SATA data cables for internal storage devices. The current SATA2 interface allows up to 3.0 Gb/s data transfer rate.

USB 2.0 Headers
(9-pin USB0_1, USB2_3, USB4_5)
(see p.15 No. 4)



There are three USB 2.0 headers on this motherboard.

System Panel Header
(9-pin PANEL1)
(see p.15 No. 11)



This header accommodates several system front panel functions.

PWRBTN (Power Switch):
Connect to the power switch on the chassis front panel. You may configure the way to turn off your system using the power switch.

RESET (Reset Switch):
Connect to the reset switch on the chassis front panel. Press the reset switch to restart the computer if the computer freezes and fails to perform a normal restart.

PLED (System Power LED):
Connect to the power status indicator on the chassis front panel. The LED is on when the system is operating. The LED keeps blinking when the system is in S3 sleep state. The LED is off when the system is in S4 sleep state or powered off (S5).

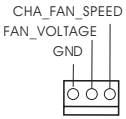
HDLED (Hard Drive Activity LED):
Connect to the hard drive activity LED on the chassis front panel. The LED is on when the hard drive is reading or writing data.

The front panel design may differ by chassis. A front panel module mainly consists of power switch, reset switch, power LED, hard drive activity LED, speaker and etc. When connecting your chassis front panel module to this header, make sure the wire assignments and the pin assignments are matched correctly.

3W Audio AMP Output Wafer
(4-pin SPEAKER1)
(see p.15 No. 25)

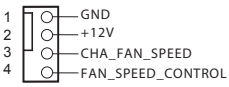
PIN	Signal Name
1	SPK L-
2	SPK L+
3	SPK R+
4	SPK R-

Chassis Fan Connector
(3-pin CHA_FAN1)
(see p.15 No. 10)



Please connect the fan cable to the fan connector and match the black wire to the ground pin.

CPU Fan Connector
(4-pin CPU_FAN1)
(see p.15 No. 28)



Please connect the CPU fan cable to the connector and match the black wire to the ground pin.

Though this motherboard provides 4-Pin CPU fan (Quiet Fan) support, the 3-Pin CPU fan still can work successfully even without the fan speed control function.
If you plan to connect the 3-Pin CPU fan to the CPU fan connector on this motherboard, please connect it to Pin 1-3.

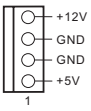
Pin 1-3 Connected

3-Pin Fan Installation

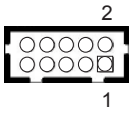
ATX Power Connector
(Input 9V-36V)
(4-pin ATX12V1)
(see p.15 No. 2)

Please connect a DC power supply (9V-36V) to this connector.
1-4 : GND
2-3 : DC Input

SATA Power Output Connector
(4-pin SATA_PWR1)
(see p.15 No. 12)



COM Port Headers
(10-pin COM1)
(see p.15 No. 22)



(10-pin COM2)
(see p.15 No. 20)

(10-pin COM3)
(see p.15 No. 18)

(10-pin COM4)
(see p.15 No. 16)

PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
10	DUMMY	8	CCTS#	6	DDSR#	4	DDTR#	2	RRXD
9	DUMMY	7	RRTS#	5	GND	3	TTXD	1	DDCD#

This motherboard supports RS232/422/485 on COM1 port. Please refer to below table for the pin definition. In addition, COM1 port (RS232/422/485) can be adjusted in BIOS setup utility > Advanced Screen > Super IO Configuration. You may refer to page 29 for details.

COM1 Port Pin Definition

PIN	RS232	RS422	RS485
1	DCD	TX-	RTX-
2	RXD	RX+	N/A
3	TXD	TX+	RTX+
4	DTR	RX-	N/A
5	GND	GND	GND
6	DSR	N/A	N/A
7	RTS	N/A	N/A
8	CTS	N/A	N/A
9	NA/+5V/+12V	N/A	N/A

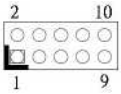
LVDS Panel Connector
(40-pin LVDS1)
(see p.15, No. 27)

PIN	Signal Name	PIN	Signal Name
2	LCD_VCC	1	LCD_VCC
4	LDDC_CLK	3	+3V
6	LVDS_A_ DATA0#	5	LDDC_DATA
8	GND	7	LVDS_A_ DATA0
10	LVDS_A_ DATA1	9	LVDS_A_ DATA1#
12	LVDS_A_ DATA2#	11	GND

English

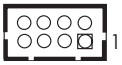
PIN	Signal Name	PIN	Signal Name
14	GND	13	LVDS_A_DATA2
16	LVDS_A_DATA3	15	LVDS_A_DATA3#
18	LVDS_A_CLK#	17	GND
20	GND	19	LVDS_A_CLK
22	LVDS_B_DATA0	21	LVDS_B_DATA0#
24	LVDS_B_DATA1#	23	GND
26	GND	25	LVDS_B_DATA1
28	LVDS_B_DATA2	27	LVDS_B_DATA2#
30	LVDS_B_DATA3#	29	DPLVDD_EN
32	GND	31	LVDS_B_DATA3
34	LVDS_B_CLK	33	LVDS_B_CLK#
36	CON_LBKLT_EN	35	GND
38	LCD_BLT_VCC	37	CON_LBKLT_CTL
40	LCD_BLT_VCC	39	LCD_BLT_VCC

Digital Input/Output Pin Header
(10-pin JGPIO1)
(see p.15 No. 14)



PIN	Signal Name	PIN	Signal Name
1	SIO_GP24	2	SIO_GP20
3	SIO_GP25	4	SIO_GP21
5	SIO_GP26	6	SIO_GP22
7	SIO_GP27	8	SIO_GP23
9	JGPIO_PWR	10	GND

PS2_KB_MS1
(8-pin PS2_KB_MS1)
(see p.15 No. 24)

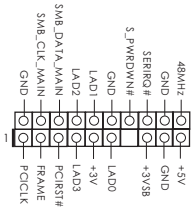


PIN	Signal Name	PIN	Signal Name	PIN	Signal Name	PIN	Signal Name
8	GND	6	GND	4	+5V STANDBY	2	+5V STANDBY
7	MSCLK	5	MSDATA	3	KBDATA	1	KBCLK

Backlight & Amp Volume Control
(7-pin BLT_VOL1)
(see p.15 No. 8)

PIN	Signal Name
1	GPIO_VOL_UP
2	GPIO_VOL_DW
3	PWRDN
4	GPIO_BLT_UP
5	GPIO_BLT_DW
6	GND
7	GND

TPM Header
(17-pin TPM1)
(see p.15 No. 19)



This connector supports Trusted Platform Module (TPM) system, which can securely store keys, digital certificates, passwords, and data. A TPM system also helps enhance network security, protects digital identities, and ensures platform integrity.

Chassis Intrusion Headers
(2-pin CI1, CI2)
(see p.15 No. 23)

This motherboard supports CASE OPEN detection feature that detects if the chassis cover has been removed. This feature requires a chassis with chassis intrusion detection design.

Buzzer Header
(2-pin BUZZ1)
(see p.15 No. 26)

English

4.5 Expansion Slots (mini-PCIe and mini-PCIe/mini-SATA Slots)

There is 1 mini-PCIe slot and 1 mini-PCIe/mini-SATA slot on this motherboard.

Before installing an expansion card, please make sure that the power supply is switched off or the power cord is unplugged. Please read the documentation of the expansion card and make necessary hardware settings for the card before you start the installation.

mini-PCIe slot:

MINI_PCIE1 (mini-PCIe slot; half size) is used for WiFi module.

mini-PCIe/mini-SATA slot:

MINI_PCIE2 (mini-PCIe/mini-SATA slot; full size) is used for PCI Express mini cards or mSATA cards.